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From: Ham-Space Mailing List and Newsgroup <ham-space@ucsd.edu>  
Errors-To: Ham-Space-Errors@UCSD.Edu  
Reply-To: Ham-Space@UCSD.Edu  
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Ham-Space Digest                      Sat, 18 Sep 93                      Volume 93 : Issue    32

Today's Topics:

                    PB.EXE on a 4.77mhz XT?  
         SPACE TRIVIA LIST UPDATE - 16th September, 1993  
         Two-Line Orbital Element Set: Space Shuttle

Send Replies or notes for publication to: <Ham-Space@UCSD.Edu>  
Send subscription requests to: <Ham-Space-REQUEST@UCSD.Edu>  
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Ham-Space Digest are available  
(by FTP only) from UCSD.Edu in directory "mailarchives/ham-space".

We trust that readers are intelligent enough to realize that all text  
herein consists of personal comments and does not represent the official  
policies or positions of any party. Your mileage may vary. So there.  
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Date: Thu, 16 Sep 1993 15:38:12 GMT  
From: world!eac@uunet.uu.net  
Subject: PB.EXE on a 4.77mhz XT?  
To: ham-space@ucsd.edu

In <199309151852.AA42146@freenet.scri.fsu.edu> bmm1@freenet.scri.fsu.edu (Bruce M.  
Marshall) writes:

> I recently upgraded PB.EXE from the older version to the 4-30-92 version. The  
> old version ran fine but the new version locks up my computer requiring a  
> reboot.

If I remember correctly, that version of PB was compiled using 80286  
instructions. It will not run on a XT with a 8088 or 8086 processor.

73 Eric    WB1HBU   eac@world.std.com  
  
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From: munnari.oz.au!metro!seagoon.newcastle.edu.au!scorch!lukpla@network.ucsd.edu  
Subject: SPACE TRIVIA LIST UPDATE - 16th September, 1993  
To: ham-space@ucsd.edu

IF YOU POSSIBLY CAN, PLEASE CONTRIBUTE TO THIS LIST. THIS LIST DEPENDS  
UPON THE KIND DONATIONS OF ITEMS FROM PEOPLE ON THE NET.

Well, I guess it's been awhile since the last update, but you see I've been a bit snowed under and the newsgroups needed a little settling down after the Mars Observer fiasco.

We've had a few excellent submissions, and I am nearly finished Mike Collins' book 'Lift Off'. I'd also like to thank Ken Hollis for his more than generous efforts in supplying us with some excellent reading material for the collection of trivia.

This list is now available via anonymous ftp from the following sites:

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krakatoa.jsc.nasa.gov as /misc-docs/trivia.txt
ames.arc.nasa.gov as /pub/SPACE/MISC/trivia.txt
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If at ANY time you want the latest update on the trivia list, then it will be at one of these sites. I will be updating the complete list to these sites each time an update appears in the newsgroups.

The news distribution of this file is now:-

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sci.space
sci.space.shuttle
sci.astro

rec.radio.amateur.space
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The last group will only be included when there are new items of trivia are related to amateur radio in some way.

Luke Plaizier - Space Trivia List Moderator

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*      SPACE TRIVIA - Interesting Trivia Information on Manned and
*                      Unmanned Spaceflight from anywhere around the
*                      Globe. (Or the Universe for that matter!)
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(126) The tip of the escape tower on the Saturn V/Apollo was topped by an item called a Q-Ball made by a company called Nortronics. That's all I know for certain. I surmise it may have been an optical retroreflector to get an accurate position measurement at initial lift-off, but it could have been something more exotic. Any answers would be appreciated.  
[From rriemer@nas.edu]

I believe it is like an aircraft pitot tube and measures the value of 'Q', the dynamic air pressure. (Ever heard of MAX-Q? It is the period of ascent during which the shuttle must throttle back due to the thickness of the air and the speed of the orbiter.)  
[From jcm@urania.harvard.edu (Jonathan McDowell)]

Discussing the escape tower.... "The extreme nose of the cylindrical structure housed the two canards and a Q-ball, a device equipped to sense different dynamic pressures on the nose of the ascending vehicle and to monitor the space vehicle's angle of attack during flight."  
[Baker, David. The History of Manned Space Flight. New York: Crown Publishers, 1981. ISBN 0-517-54377-X. Page 258.] Also, "Saturn/Apollo" is better terminology than "Saturn V/Apollo"--the same escape tower and Q-ball was used on the Saturn IB launches of Apollo 7, the three Skylab missions, and Apollo/Soyuz.  
[ From kelvin@autodesk.com (John Walker)]

(203) The highest sustained G-load experienced by a human was when a Navy Lieutenant by the name of Carter Collins tested his own specially moulded Mercury couch, taking a load of 20.4G's for six seconds. The doctors who examined him revealed that some tiny blood vessels under the surface of the skin had ruptured, but that this was not a serious injury and did Collins no serious harm.  
[John Glenn, We Seven, 1962.]

On Decmber 10th, 1954 Lt. Col. John P. Stapp experienced (with no permanent injury) almost 40 g deceleration on a rocket sled which reached a peak speed of 1017 km/hour before coming to a rapid stop. In 1958, Captain Eli L. Beeding experienced 83 g for 0.04 seconds.  
[Baker, David. The History of Manned Space Flight. New York: Crown Publishers, 1981. ISBN 0-517-54377-X. Page 26.] I don't know if these records have been broken since 1958.  
[From kelvin@autodesk.com (John Walker)]  
(Can anyone check on the 'Highest load' statement, I mean that was 30 years ago!]

(234) Pete Conrad's first words from the lunar surface after landing Apollo 12, the second landing mission, were "Whoopee! Man, that may have been a small one for Neil, but that's a long one for me!"

Conrad is 5'7" tall.

[Baker, 369. Michael Collins: Liftoff, p. 156,  
from kelvin@autodesk.com (John Walker)].

- (235) One of the less-than-great moments of NASA PR during the Apollo program was when, on Apollo 12 which, despite a lightning strike seconds after launch (item 20), made a pinpoint landing less than 200 meters from Surveyor 3. Less than two minutes into the first lunar EVA Pete Conrad accidentally pointed the TV camera (the first colour TV camera sent to the surface in Apollo) at the Sun. The vidicon tube burned out instantly. For the rest of the mission, only radio from the surface was available. [Baker, 369].  
[from kelvin@autodesk.com (John Walker)]
- (236) The first attempt to launch Gordon Cooper's Faith 7 on the final mission of Project Mercury was scrubbed on May 14, 1963 due to the failure of...a diesel engine! When the time came to retract the gantry at pad 14, the engine that pulls it wouldn't start. By the time the little engine that couldn't was coaxed into operation, problems had developed at the Bermuda tracking station which required the scrub. Cooper was launched successfully the next day.  
[Baker, 160. From kelvin@autodesk.com (John Walker)]
- (237) Turnaround time ain't what it used to be....
1. Gemini VI was originally scheduled to rendezvous and dock with an Agena target vehicle. On October 25, 1965, the Agena was launched on its Atlas booster but exploded six minutes and 20 seconds after launch. In only \*38 days\*, the mission was reprogrammed into the "Spirit of 76" mission in which Gemini VI-A would rendezvous with the Gemini VII long-duration mission. Gemini VI was launched from Pad 19 on December 4, 1965 and within \*eight days\* the Titan booster and Gemini VI were stacked on the same pad, checked out, and counted down to launch on December 12. After a heart-stopping engine shutdown Gemini VI-A was successfully launched \*three days\* later, on December 15, 1965, [Baker, 219-221, 249]
  2. After the loss of the Gemini VI Agena, NASA decided to build the Augmented Target Docking Adaptor (ATDA). It was approved, designed, manufactured, tested, and delivered to the Cape within \*85 days\*. When the Atlas booster for Gemini IX's Agena target failed on May 17, 1966, (see 148a) the ATDA was pressed into service. On June 1, 1966, only \*15 days\* after the failed Agena launch, another Atlas launched the ATDA and the redesignated Gemini IX-A was launched in pursuit on June 3. Unfortunately, the boost shroud failed to jettison completely, leaving the target an "angry alligator" (see 148).  
[Baker, 236, 249. From kelvin@autodesk.com (John Walker)]
- (238) During a Moon landing, the fuel burned by the descent stage propulsion system (8187 kg) was more than twice the dry weight of

the entire Lunar Module (3900 kg).

[Baker, 299, 535. From kelvin@autodesk.com (John Walker)]

- (239) Jules Verne's novels, the 1865 *De la terre a la lune* (From the Earth to the Moon), and 1870's *Autour de la lune* (Around the Moon) stand as monuments of prophecy in speculative fiction. Consider what Verne envisioned for his 19th century Moon mission versus what happened more than a century later.
- a) The mission was launched from Florida.
  - b) There was a great rivalry between Florida and Texas to become the home of the mission.
  - c) The moon ship was "cylindro-conical" in shape, 9 feet in diameter and 12 feet tall, and fabricated of aluminium. (The Apollo CSM was a cylindro-conical shape, the CM was 13 feet in diameter and 11 feet tall, fabricated of aluminium.)
  - d) The crew consisted of three men.
  - e) Carbon dioxide was scrubbed from cabin air by potassium hydroxide. (Apollo used lithium hydroxide.)
  - f) A suborbital test flight of subscale ship with animals on-board was conducted.
  - g) The launcher cannon was named "Columbiad". (Apollo 11's command module was "Columbia".)
  - h) It was launched in December.
  - i) The first mission to the Moon did not land, but went into lunar orbit.
    - j) Rockets were fired to escape from lunar orbit into an Earth return trajectory.
    - k) Upon return to the Earth, the projectile landed in the Pacific Ocean, and was picked up by a ship of the U.S. Navy.

Verne did get a few things wrong. The "wagon-projectile" was launched by a 900 foot long cannon charged with 400,000 pounds of gun-cotton (nitrocellulose), not a rocket, was lit by gaslight, and carried hunting rifles, two dogs, a rooster and six hens, and fine French wine. And the entire Moon project cost \$5,446,675, raised by a worldwide public subscription.

Neil Armstrong commented upon the remarkable parallels between Verne's vision and the reality of Apollo 11 in the last in-flight television broadcast as Apollo 11 was en-route to Earth. [Jules Verne: *De la terre a la Lune* (ISBN 2-253-00631-9), *Autour de la Lune* (ISBN 2-253-00587-8). Michael Collins: *Liftoff*, p. 12.]  
[ From kelvin@autodesk.com (John Walker)]

- (240) One of my favorite stories (though you should probably check out the veracity of it) is in regards to the Apollo program. Several of the early launches were on Little Joe II rockets, which were solid fuel boosters, and were designed mainly to test the escape tower system. The Little Joe II rocket was described by one NASA official as being "the most reliable booster we've ever built". On the last such flight,

the fuel charge in the Little Joe II shattered several seconds before the scheduled test of the escape tower, creating a true emergency for the escape tower to handle (the escape tower worked perfectly). The Little Joe II launches, by the way, took place at White Sands Missile range.

[jones%azterra@sj.ate.slb.com (Clark Jones)]

The incident occurred on May 19th, 1965, when the third Little Joe II, scheduled for an 89 second burn to 35 km, where the escape system would be triggered, began uncommanded rolls seconds after launch. The Apollo launch escape system triggered, as designed, and successfully returned the boilerplate Command Module to the ground. The test was repeated on January 20th, 1966, on the fourth and final Little Joe II abort test and was a complete success; the escape system extracted the Command Module from the booster at 24 km and returned it safely to the ground.

[Baker, David. The History of Manned Space Flight. New York: Crown Publishers, Inc. 1981. ISBN 0-517-54377-X. Pages 261, 263.

From kelvin@autodesk.com.]

- (241) At one time, the Gemini space craft was going to land on land rather than on water, with a rather bizzare inflatable "hang-glider" instead of parachutes. (I remember having a NASA publication when I was a kid that had drawings of this configuration. It even showed the storage compartment for the inflatable wing running between the two hatches.)

[jones%azterra@sj.ate.slb.com (Clark Jones)]

The device was called the "Rogallo wing", named after its inventor Francis M. Rogallo of the Langley Research Center, who made a presentation to Bob Gilruth about it in early 1959. It became a key part of the concept of "Mercury Mk. II", which eventually became the Gemini program. North American Aviation received the contract to develop the Rogallo wing or "paraglider" in November 1961; the original mission schedule envisioned using it from the second launch and thereafter (the second launch was to be the first manned launch of Gemini). The development program ran into one problem after another: tangled lines, crashes, and schedule slips which would have made it impossible to use the paraglider before the seventh mission. With a total weight penalty of 360kg (including landing skids which would deploy from the bottom of the spacecraft), and fiercely opposed by Chris Kraft's Flight Operations Division, the paraglider effort ground to a halt in 1964. An artifact of the paraglider remained on Gemini--the two point suspension system that deployed from between the crew hatches and tilted the spacecraft to a 55 degree angle for landing, even for parachute water landings. It is the deployment of this suspension system, not the parachute itself, which cracked Gus Grissom's helmet visor on Gemini 3, as mentioned in item 80(b)(i).

[Baker, David. The History of Manned Space Flight. New York: Crown Publishers, Inc., 1981. ISBN 0-517-54377-X. See pages 106-107,

175-176, and 201 including two pictures of the paraglider.  
[From kelvin@autodesk.com.]

- (242) The major change to the Atlas launcher for the Mercury flights of the early 60's was the Abort Sensing System. Not happy to call it ASS, the Air Force labelled it ASIS for Anort Sensing and Implementation System. The people at NASA, though, thought this was meant to be 'as is' meaning that it was basically an unmodified ICBM.  
[From 'Lift Off' by Michael Collins, pg 34]
- (243) For the construction of the Mercury spacecraft, NASA engineers had to learn how to weld Titanium 0.01 inches thick.  
[From 'Lift Off' by Michael Collins, pg 36]
- (244) Federal Prison specifications require a minimum cell space of some 475 cubic feet per inmate. Mercury had a habitable volume of 40 cubic feet, about the same size as a coffin.  
[From 'Lift Off' by Michael Collins, pg 39]
- (245) Years later, concerning the trend of sending Monkeys into orbit before the trained astronauts, Chuck Yeager commented 'I'm wouldn't want to sweep off Monkye shit before I sat down in that capsule.'  
[From 'Lift Off' by Michael Collins, pg 46]
- (246) Enos, the first Monkey to go into Orbit on board a Mercury Atlas, should have been awarded NASA Excepeional Service Medal. Even though he carried out all his prescribed tasks, with his good behaviour rewarded with banana pellets and punished with electric shocks. Half way through the flight one of the levers malfunctioned, and ENOS received nearly 80 undeserved shocks.  
[From 'Lift Off' by Michael Collins, pg 52]
- (247) If Kennedy had said fly around the Moon instead of landing on it, the basic Mercury capsule could have been stretched enough to sustain a single astronaut on a circumlunar flight.  
[From 'Lift Off' by Michael Collins, pg 67]
- (248) The Gemini spacecraft had an annoying design flaw based on economics that annoyed all the fighter pilots. There was only one attitude controller, mounted between the two seats. Therefore the man in the right seat had to train his hands to revere roles.  
[From 'Lift Off' by Michael Collins, pg 74]
- (249) The first launch of Gemini 6 was aborted due to the self-destruction of their Agena docking target. The second attempt, as they were on their way to chase Gemini 7, also ended in an abort, but one





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(1) It seems that after STS-1 got in orbit, one of the astronauts was eager to try out the (older, also expensive) toilet. I think it was Crippen. Apparently all John Young heard was this "Whoosh AHHHHHH!!!!". There is a fan in it to suck down the contents. Apparently the fan was verified to be working correctly (i.e. it spun up) but nobody ever checked to see if it sucked or blew...  
[From HOLLIS@TITAN.KSC.NASA.GOV]

(2) When trying to find a way to keep the water out of the parachute compartment after splashdown, scientists ended up using a product from a drug store. I saw this on a space travel special. The story goes something like one of the project scientists sons was up with a cold. So, the scientist mixed up a cold remedy gel (added water to a powder) for his son late one night. This gave him the idea. When itemizing the inventory for the project budget, they used the drug store product code and used a backwards spelling of the product name. Of course, they adapted it a bit for the spacecraft, but the same principle of this gel was used.  
[mark.blevis@gmail.dgrc.doc.ca]

(3) Supposedly, one shuttle launch was delayed due to a rare bird nesting in the launch pad gantry. Does anyone know if this is true and if so which launch ? (According to the guide on a KSC coach tour - probably not the most reliable of sources 8-})  
[Mark Grant <mark@isltd.insignia.com>]

(4) The Demise of Blue Streak and ELDO put paid to plans laid in 1968 to launch leeches - 'the world's most ideal space travellers' - on an extended flight.

"Give them a bloody meal before they go, and they'll need nothing for a year-and-a-half!" was how one scientist characterized the suitability of leeches for space travel. Posing no feeding or waste disposal problems, leeches might even breed en-route - providing researchers with a useful insight into the genetic side-effects induced by exposure to radiation in space.

(5) In some respects, Neil Armstrong was fortunate to become the first Moonwalker. In 1963, his place in the history books was under seige from a chimpanzee named Howard!

After just one year of study at the US Space School, Howard had broken the world's land speed record in a rocket propelled sled, and had been banned from playing noughts-and-crosses with visitors because he usually won!

The chances are that if a monkey had been selected to fly to the Moon instead of a man, it would have been Howard.

- (6) Under the direction of NASA's Ames Research Center in California, a study was conducted into the viability of employing a 'vacuum cleaner' type device in Low-Earth orbit to collect some of the particles of Moonrock (tectites) that are dislodged from the lunar surface by annual meteorite showers and sometimes find their way to the Earth's surface.

Collected in orbit and returned to Earth by parachute, samples gathered in this way would be free from the contamination caused by passage through the Earth's atmosphere.

- (7) In reference to item 64 in the trivia list, Is the reason given true? 1978-1986 the rumor was that if ejected at 100 Kft then you would drift up to 200 Kft before falling back. During the fall, the aero heating would become so intense that helmet melting would be likely. I'd love to know real reason the 100Kft limit was enacted.  
[from rlove@raptor.rmug.org]

(Can anyone come up with some sources for backing up/refuting the last three items?)

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(255)

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Date: Wed, 15 Sep 1993 22:50:23 GMT  
From: iris.mbvlab.wpafb.af.mil!blackbird.afit.af.mil!tkelso@uunet.uu.net  
Subject: Two-Line Orbital Element Set: Space Shuttle  
To: ham-space@ucsd.edu

The most current orbital elements from the NORAD two-line element sets are carried on the Celestial BBS, (513) 427-0674, and are updated daily (when possible). Documentation and tracking software are also available on this system. As a service to the satellite user community, the most current elements for the current shuttle mission are provided below. The Celestial BBS may be accessed 24 hours/day at 300, 1200, 2400, 4800, or 9600 bps using 8 data bits, 1 stop bit, no parity.

Element sets (also updated daily), shuttle elements, and some documentation and software are also available via anonymous ftp from archive.afit.af.mil (129.92.1.66) in the directory pub/space.

1	22795U	93 58	A	93258.24999999	.00036093	00000-0	86022-4 0	126
2	22795	28.4632	338.9585	0022971	349.6218	99.8392	15.94634668	436
1993 058B								
1	22796U	93 58	B	93258.41285176	-.00018167	00000-0	-35758-1 0	54
2	22796	15.3562	357.0380	7465464	0.0501	359.7520	2.00225257	60
1993 058D								
1	22797U	93 58	D	93257.40822743	-.00000217	00000-0	99999-4 0	34
2	22797	15.4804	356.5146	7472297	359.9513	359.9406	2.01097297	41
1993 058C								
1	22798U	93 58	C	93255.84373842	.00021892	00000-0	79894-4 0	13
2	22798	28.4606	357.0089	0022166	244.8563	57.6075	15.86464053	54
1993 058E								
1	22799U	93 58	E	93256.85766689	.02916751	00000-0	48785-2 0	35
2	22799	28.4305	349.5217	0016725	274.5421	87.5965	15.96195614	210
1993 058F								
1	22800U	93 58	F	93258.29415584	.00044033	00000-0	90668-4 0	24
2	22800	28.6263	338.5311	0043635	194.3319	170.6107	15.95958911	449

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End of Ham-Space Digest V93 #32

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